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EXAMINER	
OCAMPO, MARIANNE S	
ART UNIT	PAPER NUMBER
1723	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/829,714	DENTON ET AL.	
	Examiner	Art Unit	
	Marianne S. Ocampo	1723	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 January 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7,10,18-20,22,23,25,26,39-46 and 52-65* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7,10,18-20,22,23,25,26,39-46 and 52-65* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 18 – 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Verdegan et al. (US 6,422,395 B1).

3. With regards to claims 18 - 19, Verdegan et al. disclose a filter element comprising:

- a cylindrical filter media (30, 70) and
- an exoskeleton support structure (in the form of a perforated inner support liner, 40)

supporting the filter media (30) and the filter media (30, 70) being formed of a plurality of layers folded into a plurality of longitudinally-extending pleats having radially-inner peaks defining an inner diameter (along inner circumference 76) and radially-outer peaks defining an outer diameter and sidewalls therebetween, and having a pleat density of at least 5 – 11 pleats per inner

diameter inch, which would include a number greater than 5 – 11 pleats per inner diameter inch such as those in the range of about 12 or more pleats per inner diameter inch (claim 18) and a pleat density of about 13 pleats per inner diameter inch (claim 19), and the height of each pleat being substantially equal or less than the difference between the outer and the inner diameters, as in figs. 1 – 5 and cols. 1 – 4.

4. In the instance where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. ***In re Wertheim***, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); ***In re Woodruff***, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990). Similarly, a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. ***Titanium Metals Corp. of America v. Banner***, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985). In this particular case, at least 5 – 11 pleats per inner diameter inch has been disclosed by Verdegan et al. to be the pleat density of the filter element of Verdegan et al., and it is considered obvious that a pleat density of about 12 or more pleats per inner diameter inch (claim 18) or about 13 pleats per inner diameter inch, is included or lie inside (on the maximum end of) the range of at least 5 – 11 pleats per inner diameter inch taught by Verdegan et al. It is considered obvious to one of ordinary skill in the art to modify the number of pleats per inner diameter inch/increase the pleat density of the filter element in order to provide more filtration surface area to trap/remove contaminants from the fluid flowing through the filter media.

5. Claims 1 – 3, 10, 53 – 58 and 64 – 65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Verdegan et al. (US 6,422,395 B1) in view of Brownell (US 4,464,263) and Nutter et al. (US 3,505,794).

6. Concerning claims 1, 64 and 65, Verdegan et al. disclose a micro-filter element, capable of removing impurities in the range of about 0.5 μm to about 25.0 μm which includes soot from fuel which could be aviation fuel or hydrocarbon fuel (as in cols. 1 & 4), said element comprising:

- a cylindrical filter media (30, 70), and
- an exoskeleton (in the form of an inner exoskeleton/support/liner (40) for the filter media (30, 70); and
- the filter media (70) including a filtration layer (72) sandwiched between inner (82) and outer (80) layers, and
  - the filtration layer (72) being (could be) made of fiberglass (as in lines 54 – 59 of col. 3) and/or at least one polymer (such as PPS (polyphenylene sulfide), aliphatic-aromatic polyamide or polyester, etc., as in lines 44 – 47 of col. 3 & lines 15 – 17 of col. 4);
  - the inner and outer layers (82 & 80, respectively) being made of criss-crossed wires/screen; and

▪ the layers (82, 72, 80) of the filter media (70) being folded into a plurality of longitudinally-extending pleats with a density of at least 5 - 11 pleats per inner diameter (76) inch, which includes the claimed range of about 8 or more pleats per inner diameter inch; and

• the exoskeleton (40) comprising a support screen (perforated metal liner) supporting the pleats in an appropriately spaced and non-collapsed condition and the support screen (40) providing at least 50% open flow area so that the filter media (70) is supported, without having (extra) cellulose-fiber and/or woven-mesh endoskeleton support layers, as in cols. 1 – 4 and figs. 1 – 3.

Verdegan et al. fail to disclose ***the inner and outer layers being made of non-woven polymer*** *and the* ***exoskeleton being bonded to peaks*** *of the pleats* ***and providing a tight array of attachment points.***

7. Brownell teaches a similar pleated filter element to that of Verdegan et al. comprising a cylindrical filter element/medium (12) and an exoskeleton (16) for the filter element (12), wherein the exoskeleton (16) comprises a support screen (the term "support screen" has been broadly defined to include any perforated and/or woven support sleeve or tube usable for screening particulates, etc. contained in a fluid) being bonded to peaks (14) of the pleats to support the pleats in an appropriately spaced and non-collapsed condition, and the support screen/exoskeleton (16) providing at least 50% open flow area (with openings 18 shown in fig.

1)and a tight array of attachment points so that the filter element would be sufficiently supported without having cellulose-fiber and/or woven mesh endoskeleton support layers, and the exoskeleton (16) may also be located innermost (see col. 3, lines 65 – 68) of the rolled/cylindrical filter element or on the outside of the filter element (as in fig. 1), as in figs. 1 – 6 and cols. 1 – 4.

It is considered obvious to one of ordinary skill in the art at the time of the invention to modify the microfilter element (having an exoskeleton in the form of an inner support screen/liner 40 supporting an innermost surface of the filter element) of Verdegan et al. by adding the embodiment taught by Brownell, in order to provide an improved and alternative design for the filter element by providing an effective exoskeleton/supporting sleeve/liner for the pleated filter media/element on either the innermost or outside surface thereof, thereby providing a means for preventing collapse and movement of the pleats of the filter media, thereby ensuring the same/uniform surface area available for fluid flow at all times (see col. 1 of Brownell). Having the exoskeleton/liner be bonded and instead of freely supporting the filter element, prevents any movement of the peaks/pleats of the filter element, thereby ensuring uniform spacing between the pleats of the filter element for providing uniform surface flow area at all times, at the same time, prevent damage to the filter element.

8. Verdegan et al., as modified by Brownell, fail to teach ***the inner and outer layers of the filter media being made of non-woven polymer***.

9. Nutter et al. teach a similar pleated filter element comprising a cylindrical filter media (38) and an exoskeleton (in the form of an inner perforated support screen 50) for the filter media (38), wherein the filter media includes at least one filtration layer (64) sandwiched between inner and outer layers (58 and 56 respectively), the filtration layer (64) being made of fiberglass and the inner and outer layers (58 and 56) being made of non-woven polymer, in the form of non-woven acetate-type membrane/other synthetic fibers, as in cols. 1 – 3 and figs. 2 – 3.

It is considered obvious to one of ordinary skill in the art at the time of the invention to modify the material of construction of the inner and outer layers of the filter media of Verdegan et al., as modified by Brownell, by adding the embodiment taught by Nutter et al., in order to provide a filter element (i.e. composite filter media) which would not corrode (i.e. corrosion-resistant) and also light-weight compared to its metallic counterparts. The combination of Verdegan et al., Brownell and Nutter et al. would provide a resulting filter element having a filter media which is polymeric (made of at least one polymer or synthetic material) and an exoskeleton/supporting sleeve (inner support sleeve) also formed of a (thermo) plastic/polymeric material.

10. Regarding claim 2, Verdegan et al., as modified by Brownell and Nutter et al., have taught the limitations of claim 1 above. Verdegan et al. also disclose the layers of the filter media consisting essentially of the filtration layer (72), the inner layer (82) and the outer layer (80), as in figs. 2 – 5.

11. With respect to claim 3, Verdegan et al., as modified by Brownell and Nutter et al., have taught the limitations of claim 2 above. Verdegan et al. further disclose the filtration layer (72) having a thickness of about 0.025 inch to about 0.075 inch, which includes some values in the claimed range of about 0.015 inch to about 0.035 inch, and the inner and outer layers (82 & 80) each having a thickness of about 0.014 inch, as in col. 2, lines 62 – 65 & col. 3, lines 22 – 30.

12. Concerning claim 10, Verdegan et al. disclose a filter element comprising:

- a cylindrical filter media (30, 70) and,
- an exoskeleton support structure (40) surrounding (an inner periphery of) the filter media (30, 70); and
- the filter media including a filtration layer (72 which can be formed of PPS, polyamides or polyester) being formed of cellulose-fiber free layers and sandwiched between inner and outer layers (82 and 80, respectively);
- the layers (82, 72, 80) of the filter media (70) being folded into a plurality of longitudinally extending pleats having radially-inner peaks (at 88, 90) defining an inner diameter, radially-outer peaks (at the opposite end of 88 & 90) defining an outer diameter and side walls extending therebetween, wherein the layers of the filter media (70) consist essentially of the filtration layer (72), the inner layer (82) and the outer layer (80), as in figs. 2 – 5 and cols. 2 – 3.

Verdegan et al. fail to disclose *the inner and outer layers of the filter media being also formed of cellulose-fiber –free and woven-mesh free layers*, and the exoskeleton support structure being attached to the radially-outer peaks and/or radially-inner peaks in such a manner that the filter media is sufficiently supported without (additional or extra) cellulose-fiber and/or woven-mesh endoskeleton support layers.

13. Brownell teaches a similar pleated filter element to that of Verdegan et al. comprising a cylindrical filter element/medium (12) being folded into a plurality of longitudinally extending pleats having radially-inner peaks defining an inner diameter, radially-outer peaks defining an outer diameter and sidewalls extending therebetween, and an exoskeleton support structure (16) for the filter element (12), wherein the exoskeleton support structure (16) is bonded/attached to radially-outer peaks (14) or to the innermost/radially-inner peaks (i.e. those on the innermost surface of the filter) of the pleats so that the filter element would be sufficiently supported without having cellulose-fiber and/or woven mesh endoskeleton support layers, as in figs. 1 – 6 and cols. 1 – 4.

It is considered obvious to one of ordinary skill in the art at the time of the invention to modify the exoskeleton/support structure (40) of Verdegan et al. by substituting it with the embodiment taught by Brownell, in order to provide an alternative and a more effective support structure for the pleated filter media/element which provides a means for preventing collapse and movement of the pleats of the filter media, thereby ensuring the same/uniform spacing and uniform surface area available for fluid flow at all times (see col. 1 of Brownell).

14. Verdegan et al., as modified by Brownell, fail to teach the inner and outer layers of the filter media sandwiching the filtration layer being formed of celloluse-fiber free and woven-mesh free layers.

15. Nutter et al. teach a similar pleated filter element comprising a cylindrical filter media (38) and an exoskeleton/support screen (50) for the filter media (38), wherein the filter media being formed of cellulose-fiber free and woven-mesh free layers, including at least one filtration layer (64) sandwiched between inner and outer layers (58 and 56 respectively), the filtration layer (64) being made of non-woven mat of fiberglass and the inner and outer layers (58 and 56) being made of non-woven polymer, in the form of non-woven acetate-type membrane/other synthetic fibers, as in cols. 1 – 3 and figs. 2 – 3.

It is considered obvious to one of ordinary skill in the art at the time of the invention to modify the material of construction of the layers of the filter media of Verdegan et al., as modified by Brownell, by adding the embodiment taught by Nutter et al., in order to provide a filter element (i.e. composite filter media) which would not corrode (i.e. corrosion-resistant) and physically stable but also light-weight, compared to its cellulose-fiber (i.e. paper) and woven-mesh (usually formed of metallic) counterparts. The combination of Verdegan et al., Brownell and Nutter et al. would provide a resulting filter element having a filter media which is polymeric (made of at least one polymer or synthetic material) and an exoskeleton/supporting sleeve (inner support sleeve) also formed of a (thermo) plastic/polymeric material.

16. With respect to claim 53, Verdegan et al., as modified by Brownell and Nutter et al., have taught the limitations of claim 10 above. Verdegan et al. also disclose the filtration layer (72) being made of polyamide, fiberglass or polyester, as in col. 3, lines 45 – 60.

17. Regarding claim 54, Verdegan et al., as modified by Brownell and Nutter et al., have taught the limitations of claim 10 above. Verdegan et al. further disclose the inner and outer layers (82 & 80, respectively) each having a thickness of 0.014 inch, which is less than about 0.030 inches, as in col. 3, lines 22 –30.

18. With regards to claims 55 - 56, Verdegan et al., as modified by Brownell and Nutter et al., have taught the limitations of claim 10 above. Verdegan et al. disclose the layers of the filter media (70) consisting essentially of the filtration layer (72), the inner layer (82), the outer layer (80) wherein the filtration layer (72) is made of either fiberglass, polyamide or polyester, and the inner and outer layers each have a thickness of 0.014 inch, which is less than about 0.030 inches, as in col. 3, lines 22 –30 & 45 – 60 and figs. 2 - 5. As already mentioned in the rejection of claim 10 above, Verdegan et al., as modified by Brownell and Nutter et al., teach the inner and outer layers (those taught by Nutter et al., 58 and 56) being made of non-woven polymer, in the form of non-woven acetate-type membrane/other synthetic fibers, as in cols. 1 – 3 and figs. 2 – 3 of Nutter et al. The same motivation applied in claim 10 above, is being applied here.

19. Concerning claims 57 – 58, Verdegan et al., as modified by Brownell and Nutter et al., have taught the limitations of claims 56 and 10, respectively above. Verdegan et al. further disclose the filter media (70) having a pleat density of at least 5 – 11 pleats per inner diameter inch, as in col. 3, lines 1 – 5.

20. Claims 39 – 40 and 43 - 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Verdegan et al. (395) in view of Durre (US 6,206,205 B1) and Brownell (263).

21. With respect to claims 39 and 46, Verdegan et al. disclose a filter element capable of use as a coalescer element (here, the term "coalescer element" has been broadly defined by the examiner as any filter element which can perform in removing/filtering water and particulates from fuel (aviation or other kinds of fuel), comprising:

- a cylindrical filter media (30, 70) and,
- an exoskeleton (support screen, 40) surrounding (an inner periphery of) the filter media (30, 70); and
- the cylindrical media (70) comprising a plurality of longitudinally-extending pleats having radially-inward peaks (formed at the inner circumference thereof, at 88, 90) defining an inner diameter, radially-outer peaks defining an outer diameter and sidewalls extending therebetween, and
- the exoskeleton comprising a support screen (40) being disposed adjacent each of the radially-inward peaks of the pleats to support the pleats and providing an open flow area without

a (extra or additional) central tube, wherein the support screen (40) comprises a rolled sheet of screen material (perforated liner) having a width (prior to rolling into a cylinder) which could be at least approximately equal to the axial dimension of the filter media (70, 30) and a length approximately equal to the circumferential dimension of the filter media (70, 30), as in figs. 1 - 5 and cols. 1 – 3.

22. Verdegan et al. fail to disclose the exoskeleton support screen being thermally bonded to the radially-inward peaks of the pleats (claim 46) and/or radially-outer peaks (claims 39 & 45) and the sheet of screen material having a seam allowance and lateral edges joined together at a side seam (claims 39 & 46).

23. Durre et al. (205) teach a similar filter element to that of Verdegan et al., comprising:

- a cylindrical filter media (42) and
- an exoskeleton support structure (45) wherein the cylindrical media (42) comprises a plurality of longitudinally extending pleats (43) having radially-inner peaks defining an inner diameter and radially-outer peaks defining an outer diameter and side walls extending therebetween, and the exoskeleton support structure (45) being formed by a sheet of screen material (40) having a width approximately equal to the axial dimension of the filter media (42) and a length approximately equal to the circumferential dimension of the filter media (42) and a seam allowance (for joining the ends of the sheet together to form the side seam, at 50) and the

sheet having lateral edges (46, 48) being joined together at a side seam (50), as in figs. 2 – 3 and cols. 3 - 5.

It is considered obvious to one of ordinary skill in the art at the time of the invention to modify the exoskeleton of Verdegan et al. by adding the embodiment taught by Durre et al., in order to provide an alternative design and improved exoskeleton which would provide sufficient support for the pleats of the filter media at the same time, provide a structure which is less expensive to manufacture (see cols. 3 – 5 of Durre et al.).

24. Verdegan et al., as modified by Durre et al., fail to teach the support screen being thermally bonded to the radially-inward peaks of the pleats (claim 46) and/or radially-outer peaks (claims 39 and 45).

25. Brownell teach a similar pleated filter element to that of Verdegan et al., as modified by Durre et al. wherein the filter element of Brownell comprises a cylindrical pleated filter media (12) which comprises of a plurality of longitudinally extending pleats, and an exoskeleton support structure (16) which has a width approximately equal to the axial dimension of the media and a length approximately equal to the circumferential dimension of the filter media, and the exoskeleton (16) being thermally (without use of adhesives/non-adhesively) bonded to each of the radially-outer peaks (14, as in figs. 1 – 2) or each of the radially-inner peaks (14, when the support structure 16 is rolled innermost of the filter media 12) of the pleats of the filter media (12), as in figs. 1 – 2 and cols. 2 – 3 and particularly in col. 3, lines 65 – 67.

It is considered obvious to one of ordinary skill in the art at the time of the invention to modify the filter element of Verdegan et al., as modified by Durre et al., by adding the embodiment of Brownell, in order to provide an improved support structure/exoskeleton for the filter element which would provide a means for preventing collapse and movement of the pleats of the filter media, without the added expense of adhesives at the same time, ensuring the same/uniform surface area available for fluid flow at all times (see col. 1 of Brownell).

26. Regarding claim 40, Verdegan et al., as modified by Durre et al. and Brownell, have taught the limitations of claim 39 above. Verdegan et al., as modified by Durre et al. and Brownell, further teach the side seam (50 of Durre et al.) extending substantially parallel to a longitudinal axis of the filter media (42 of Durre et al.), as in figs. 2 & 6 of Durre et al. The same motivation applied in claim 39 in paragraph 23 above is applied here.

27. With regards to claim 44, Verdegan et al., as modified by Durre et al. and Brownell, have taught the limitations of claim 39 above. Durre et al. also teach the sheet of screen material (40, 45) being a flat sheet of material (which is rectangular in shape in order to form a cylindrical tube later) prior to being bent and the lateral edges (46, 48) being joined together at the side seam, as in cols. 4 - 5. The same motivation applied in claim 39 is applied here.

28. Concerning claim 45, Verdegan et al., as modified by Durre et al. and Brownell, have taught the limitations of claim 39 above. Brownell also teaches the support screen (16)

being thermally bonded to each of the radially-outer peaks, as in figs. 1 – 2 and cols. 1 – 4. The same motivation applied in claim 39 in paragraph 25 above is applied here.

29. With regards to claim 43, Verdegan et al., as modified by Durre et al. and Brownell, have taught the limitations of claim 39 above. Brownell teaches the support screen being made of a plastic material such as polyurethane, as in col. 2. Although Verdegan et al., as modified by Durre et al. and Brownell, fail to teach the support screen being made of a PVC coated fiberglass mesh, it is considered obvious to one of ordinary skill in the art to modify the plastic material forming the support screen of Verdegan et al., as modified by Durre et al. and Brownell, from polyurethane to another known type of plastic material such as PVC coated fiberglass, in order to provide an alternative material of construction for the support screen which would be as stable as those formed with polyurethane plastic but only lighter in weight.

30. Claim 41 - 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Verdegan et al., Durre et al. and Brownell, as applied to claim 39 above, and further in view of Gnamm et al. (US 5,599,449).

31. With respect to claim 41, Verdegan et al., as modified by Durre et al. and Brownell, have taught the limitations of claim 39 above. Verdegan et al., as modified by Durre et al. and Brownell, fail to teach the lateral edges of the support screen overlapping and non-adhesively thermally bonded together.

32. Gnamm et al. teach a similar filter element/support screen which can be used as an exoskeleton/support screen for a cylindrical filter media of Verdegan et al. as modified by Durre et al. and Brownell, wherein the element of Gnamm et al. having lateral edges (46, 48) which are overlapped, as in fig. 4 and can be non-adhesively thermally bonded together by the welding method already taught by Durre et al. in claim 39, to form an integral cylindrical support screen, as in cols. 2 – 4 and fig. 4.

It is considered obvious to one of ordinary skill in the art at the time of the invention to modify the support screen of Verdegan et al., as modified by Durre et al. and Brownell, by adding the embodiment taught by Gnamm et al. in order to provide an alternative design for the support screen which ensures positive abutting/joining of the lateral edges of the screen, thereby providing an improved support screen which would not separate at the side seam, thereby preventing leakage and bypassing of fluid through the side seam.

33. Regarding claim 42, Verdegan et al., as modified by Durre et al., Brownell and Gnamm et al., have taught the limitations of claim 41 above. Brownell further teaches the support screen being made of a plastic material such as polyurethane, as in col. 2. Although Verdegan et al., as modified by Durre et al., Brownell and Gnamm et al., fail to teach the support screen being made of a PVC coated fiberglass mesh, it is considered obvious to one of ordinary skill in the art to modify the plastic material forming the support screen of Verdegan et al., as modified by Durre et al., Brownell and Gnamm et al., from polyurethane to another known type of plastic material such as PVC coated fiberglass, in order to provide an alternative material of

construction for the support screen which would be as stable as those formed with polyurethane plastic but only lighter in weight.

34. Claim 52 is rejected under 35 U.S.C. 103(a) as being unpatentable over Verdegan et al. in view of Brownell (US 263) and Miller et al. (US 5,552,048).

35. With respect to claim 52, Verdegan et al. disclose a filter element capable of use as a coalescer element (here, the term "coalescer element" has been broadly defined by the examiner as any filter element which can perform in removing/filtering water and particulates from fuel (aviation or other kinds of fuel), comprising:

- a cylindrical filter media (30, 70) and,
- an exoskeleton (support screen, 40) surrounding (an inner periphery of) the filter media (30, 70); and
- the cylindrical media (70) comprising a plurality of longitudinally-extending pleats having radially-inward peaks (formed at the inner circumference thereof, at 88, 90) defining an inner diameter, radially-outer peaks defining an outer diameter and sidewalls extending therebetween, and
- the exoskeleton comprising a support screen (40) being disposed adjacent each of the radially-inward peaks of the pleats to support the pleats and providing an open flow area without a (extra or additional) central tube, wherein the support screen (40) comprises a rolled sheet of screen material (perforated liner) having a width (prior to rolling into a cylinder) which could be

at least approximately equal to the axial dimension of the filter media (70, 30) and a length approximately equal to the circumferential dimension of the filter media (70, 30), as in figs. 1 - 5 and cols. 1 – 3.

Verdegan et al. fail to disclose the exoskeleton/support screen being non-adhesively bonded to the radially-inward peaks of the pleats and providing at least 50% open flow area and a tight array of attachment points and having a first set of cords extending in a first direction, a second set of cords extending in a second direction and intersecting with the first set of cords and openings defined therebetween.

36. Brownell teaches a similar pleated filter element to that of Verdegan et al. comprising a cylindrical filter element (12) being folded into a plurality of longitudinally extending pleats having radially-inner peaks defining an inner diameter, radially-outer peaks defining an outer diameter and sidewalls extending therebetween, and an exoskeleton support structure (in the form of a perforated tube/shield 16) for the filter element (12), wherein the exoskeleton support structure (16) is non-adhesively bonded to radially-inward peaks of the pleats (in the case where shield 16 is formed and the cylindrical media is rolled to have the shield on its innermost side/surface, as in col. 3, lines 65 - 68) so that the filter element would be sufficiently supported without having an additional central tube, as in figs. 1 – 6 and cols. 1 – 4.

It is considered obvious to one of ordinary skill in the art at the time of the invention to modify the filter element of Verdegan et al. by adding the embodiment taught by Brownell in order to provide an alternative and as an effective support structure for the pleated filter media/element which provides a means for preventing collapse and movement of the pleats of

the filter media, thereby ensuring the same/uniform surface area available for fluid flow at all times (see col. 1 of Brownell).

Verdegan et al., as modified by Brownell, fail to teach the exoskeleton support structure having a first set of cords extending in a first direction, a second set of cords extending in a second direction and intersecting with the first set of cords and openings defined therebetween.

37. Miller et al. teach a similar pleated filter element (in particular the embodiment shown in fig. 9) to that of Verdegan et al., as modified by Brownell, the filter element of Miller et al. including a cylindrical filter element/media (20) comprising a plurality of longitudinally extending pleats having radially inward peaks and an exoskeleton (70, fig. 9) comprising a support screen (70) having a first set of cords extending in a first direction, a second set of cords extending in a second direction and intersecting with the first set of cords and openings (72) defined therebetween and providing at least 50% open flow area and a tight array of attachment points (at areas where the screen/wrap 70 is fuse-bonded to the pleats of the filter medium/element (20), as in cols. 11 – 12 and fig. 9.

It is considered obvious to one of ordinary skill in the art at the time of the invention to modify the exoskeleton structure of Verdegan et al, as modified by Brownell, by substituting it with the embodiment (wrap 70) taught by Miller et al., in order to provide an alternative and improved design for the filter element having a support structure which provides greater open flow area, thereby allowing more fluid to pass therethrough at one time, at the same time providing sufficient stability and support to the filter element/media and restraining movement of

the pleats of the media/element thereby increasing lifespan of the filter element, as in cols. 9 – 10 and 11 – 12 of Miller et al.

38. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Verdegan et al., Brownell and Nutter et al., as applied to claim 1 above, and further in view of Kersting (US 4,735,720).

39. Concerning claim 7, Verdegan et al., as modified by Brownell and Nutter et al., have taught the limitations of claim 1 above. Verdegan et al., as modified by Brownell and Nutter et al., also teach the plurality of longitudinally extending pleats include two end pleats joined together at a side seam formed by stitching/sewing together the end pleats, as in fig. 3 and col. 3, lines 18 – 28 of Nutter et al. Verdegan et al., as modified by Brownell and Nutter et al. fail to teach the side seam comprising an adhesive bead which encapsulates all of the layers in distal ends of the end pleats and the adhesive bead extending radially inward between the end pleats.

40. Kersting teaches a similar pleated filter element (1) comprising one or more sheets (layers) of non-woven fibrous filter sheets similar to that of Verdegan et al., as modified by Brownell and Nutter et al., being folded into a plurality of longitudinally extending pleats (3) include two end pleats (5 & 6) joined together at a side seam, and the side seam comprising an adhesive bead (9) encapsulating all of the layers/sheets of filter material in distal ends of the end pleats (5 & 6) and the adhesive bead (9) extending radially inward between the end pleats, as in figs. 1 – 3 and cols. 1 – 3.

It is considered obvious to one of ordinary skill in the art at the time of the invention to modify the side seam of the filter element of Verdegan et al., as modified by Brownell and Nutter et al., in order to provide an alternative design and improved side seam which would not rupture and thereby prevent bypassing of the filter element (i.e. leaking of fluid) through the ruptured side seam (see col. 1 of Kersting).

41. Claims 20, 22 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kersting (US 4,735,720).

42. Concerning claim 20, Kersting discloses a cylindrical filter media (1) comprising:

- a plurality of longitudinally extending pleats (3) and a side seam (9);

- the plurality of pleats including two end pleats (5 & 6), each including a filtration layer, an inner layer and an outer layer (the inner and outer layers being upstream and downstream sheets of a multiple sheet filter media, as in col. 2, lines 24 – 29);

- the two end pleats each having a distal end, a radially-outer peak (at 3), an endmost sidewall extending from the distal end to the radially-outer peak, and a radially inner peak (at 2); the sidewalls being positioned adjacent each other and the distal ends being positioned radially inward relative to the radially-outward/outer peaks; and the side seam (9) comprising an adhesive bead having a continuous mass which encapsulates all of the layers in the distal ends of the end pleats, as in figs. 1 – 3 and cols. 2 – 3. Although the side seam of the prior art (Kersting)

in relation to the location of the radially-inner peak being opposite to that of the claimed invention, it is considered obvious to one of ordinary skill in the art to form the side seam such that it is formed extending outward, instead of inward, with respect to the radially-inward peaks, as an alternative and matter of choice design by the manufacturer. The case law, ***In re Japikse***, 86 USPQ 70 (CCPA 1950), has established that a prima facie case of obviousness exists and that the limitation of *having the seams placed in an inverted manner such that the side seam extends outwardly (of the radially-inner peaks), which is opposite that of Kersting (the side seam is extending inwardly)*, is not considered an invention since the applicant is merely shifting the position of *the side seam* to a different position and the operation of the device (i.e. filter element/cylindrical filter media) would not be modified by doing so.

43. Regarding claim 22, Kersting has taught the limitations of claim 20 above, and as a result of shifting the location of the side seam (9) such that it extends outwardly with regards to the radially-inward peaks of the pleats (2), that the adhesive bead forming the side seam (9) would be also extending circumferentially between the radially outward peaks of two end pleats. The same motivation applied in claim 20 above, is applied here.

44. With respect to claim 25, Kersting discloses a cylindrical filter media (1) comprising:

- a plurality of longitudinally-extending pleats (3) and a side seam (9);

• the plurality of pleats including two end pleats (5 & 6), each having a distal end, a radially-outer peak (at 3), an endmost sidewall extending from the distal end to the radially-outer peak, and a radially inner peak (at 2);

• the sidewalls being positioned adjacent each other and the distal ends being positioned radially inward relative to the radially-outward/outer peaks; and

• the side seam (9) comprising an adhesive bead having a continuous mass which extends radially outward between endmost endwalls of the end pleats (5 & 6), as in figs. 1 – 3 and cols. 2 – 3. Although the side seam of the prior art (Kersting) in relation to the location of the radially-inner peak being opposite to that of the claimed invention, it is considered obvious to one of ordinary skill in the art to form the side seam such that it is formed extending outward, instead of inward, with respect to the radially-inward peaks, as an alternative and matter of choice design by the manufacturer. The case law, ***In re Japikse***, 86 USPQ 70 (CCPA 1950), has established that a prima facie case of obviousness exists and that the limitation of *having the seams placed in an inverted manner such that the side seam extends outwardly (of the radially-inner peaks), which is opposite that of Kersting (the side seam is extending inwardly)*, is not considered an invention since the applicant is merely shifting the position of *the side seam* to a different position and the operation of the device (i.e. filter element/cylindrical filter media) would not be modified by doing so.

As a result of shifting the location of the side seam (9) such that it extends outwardly with regards to the radially-inward peaks of the pleats (2), that the adhesive bead forming the

side seam (9) would be also extending circumferentially between the radially outward peaks of two end pleats.

45. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kersting in view of Brownell.

46. With regards to claim 23, Kersting has taught the limitations of claim 20 above. Kersting fails to disclose a filter element which further comprises an exoskeleton support structure and the filter media in claim 20 above, the support structure surrounding the filter media and being attached to radially-outward peaks of the pleats.

47. Brownell teaches a filter element comprising a cylindrical pleated filter media (12) having a plurality of longitudinally extending pleats wherein the pleats include radially-outward peaks similar to that of Kersting and further comprising an exoskeleton support structure (16) surrounding the filter media (12) and being attached to radially-outward peaks (14) of the pleats, as in figs. 1 – 2 and cols. 2 - 3.

It is considered obvious to one of ordinary skill in the art at the time of the invention to modify the filter element of Kersting, by adding the embodiment taught by Brownell, in order to provide an effective support structure for the pleated filter media/element of Kersting which provides a means for preventing collapse and movement of the pleats of the filter media, thereby ensuring the same/uniform surface area available for fluid flow at all times (see col. 1 of Brownell).

48. Claims 4 - 5 rejected under 35 U.S.C. 103(a) as being unpatentable over Verdegan et al., Brownell and Nutter et al., as applied to claim 2 above, and further in view of Miller et al. (048), Castellanos et al. (US 6,454,870 B1) and Briggs et al. (US 4,046,697).

49. Concerning claim 4, Verdegan et al., as modified by Brownell and Nutter et al., have taught the limitations of claim 2 above. Verdegan et al., Brownell and Nutter et al., fail to teach the support screen comprising a thermal-bondable mesh having cords which form a grid of approximately about 0. 060 inch to 0.150 inch by 0.060 inch to about 0.150 inch openings which are aligned with a longitudinal axis of the filter media.

50. Miller et al. teach a similar filter element to that of Verdegan et al., as modified by Brownell and Nutter et al., which comprises a cylindrical filter media/element (20) and an exoskeleton (wrap/mesh 70, as in fig. 9) surrounding the filter media (20), wherein the support screen comprises a thermal-bondable mesh (in the form of a *fusible* (*can be fuse bonded*) polymeric mesh, 70) having cords which form a grid of openings (72), as in fig. 9 and cols. 11 – 12.

It is considered obvious to one of ordinary skill in the art at the time of the invention to modify the support screen of the filter element of Verdegan et al., as modified by Brownell and Nutter et al., by adding/substituting it with the support screen taught by Miller et al., in order to provide an alternative support screen structure which can provide stability/support and extend the

life of the filter element thereby providing a structure which would prevent collapse and damage to the pleated filter media (see cols. 9 - 10 of Miller et al.), at the same time providing greater open flow area than the one taught by Brownell.

51. Verdegan et al., as modified by Brownell, Nutter et al. and Miller et al. fail to teach the mesh providing a grid of openings of approximately about 0. 060 inch to 0.150 inch by 0.060 inch to about 0.150 inch openings and the openings being aligned with a longitudinal axis of the filter media.

52. Castellanos et al. teach a thermal-bondable mesh for use as a support screen structure (exoskeleton) for a pleated filter media such as the one taught by Verdegan et al., as modified by Brownell, Nutter et al. and Wright et al., formed of extruded plastic or polymer (i.e. polymeric mesh) and having cords which form a grid of openings (20) of in the range of 0.1 inch to 0.2 inch by 0.1 inch to 0.2 inch, which includes at least some values in the claimed range mentioned in claim 4, as in col. 3, lines 8 – 14 & figs. 1 & 4.

It is considered obvious to one of ordinary skill in the art at the time of the invention to modify the mesh/support screen of Verdegan et al., as modified by Brownell, Nutter et al. and Miller et al., by adding the embodiment taught by Castellanos et al., in order to provide open flow areas through which continuous flow of unfiltered fluid can flow, at the same time a thermal-bondable mesh element or support structure which is lightweight and as effective in providing support and stability to the filter element/media.

Furthermore, the case law, ***Gardner v. TEC Systems, Inc***., 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984)], cert. Denied, 469 U.S. 830, 225 USPQ 232 (1984), the Fed. Circuit held that where the only difference between the prior art (in this instance, the device resulting from the combination of Verdegan et al., Brownell, Nutter et al. and Miller et al.) and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device.

53. Verdegan et al., as modified by Brownell, Nutter et al., Miller et al. and Castellanos et al., fail to teach the openings being aligned with the longitudinal axis of the filter media.

54. Briggs et al. teach a similar pleated filter element to that of Verdegan et al., as modified by Brownell, Nutter et al., Miller et al. and Castellanos et al., the filter element of Briggs et al. including an exoskeleton comprising a support structure (24) having openings which are oriented such that they are aligned with the longitudinal axis of the filter media, the support structure being a support screen (24) formed of a synthetic (which could be polymeric material) mesh, as in figs. 1 – 2 & 4 and cols. 1 – 2.

It is considered obvious to one of ordinary skill in the art at the time of the invention to modify the exoskeleton support structure of Verdegan et al., as modified by Brownell, Nutter et al., Miller et al. and Castellanos et al., by adding the embodiment taught by Briggs et al., in order to provide an alternative design for the support structure, as a matter of choice by the

manufacturer or user. In this instance, the openings are square-shaped (in Briggs' et al.) while those of Miller et al. and /or Castellanos et al. are diamond-shaped. The case law, ***In re Dailey***, 357 F.2d 669, 149 USPQ 47 (CCPA 1966), provided (The court held) that the configuration of the claimed invention (in this instance, orienting the openings of the thermal bondable mesh from slightly diagonal (diamond-shaped), instead of being aligned (i.e. square-shaped) with the longitudinal axis of the filter media) was a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed invention was significant.

55. With regards to claim 5, Verdegan et al., as modified by Brownell, Nutter et al., Wright et al. and Castellanos et al., have taught the limitations of claim 4 above. Brownell, as mentioned in claim 1 above, has taught the support screen of Brownell being bonded to radially outer peaks of the filter media, as in figs. 1 – 2. In addition, Miller et al., Castellanos et al. and Briggs et al. also teach the support screen being bonded to radially outer peaks of the media.

56. Claim 6 rejected under 35 U.S.C. 103(a) as being unpatentable over Verdegan et al., as modified by Brownell, Nutter et al., Miller et al., Castellanos et al. and Briggs et al., as applied to claim 4 above, and further in view of Kersting (720).

57. Concerning claim 6, Verdegan et al., as modified by Brownell, Nutter et al., Miller et al., Castellanos et al. and Briggs et al., have taught the limitations of claim 4 above.

Verdegan et al., as modified by Brownell and Nutter et al., also teach the plurality of longitudinally extending pleats include two end pleats joined together at a side seam formed by stitching/sewing together the end pleats, as in fig. 3 and col. 3, lines 18 – 28 of Nutter et al. Verdegan et al., as modified by Brownell, Nutter et al., Miller et al., Castellanos et al. and Briggs et al., fail to teach *the side seam comprising an adhesive bead which encapsulates all of the layers in distal ends of the end pleats and the adhesive bead extending radially inward between the end pleats.*

58. Kersting teaches a similar pleated filter element (1) comprising one or more sheets (layers) of non-woven fibrous filter sheets similar to that of Verdegan et al., as modified by Brownell, Nutter et al., Miller et al., Castellanos et al. and Briggs et al., being folded into a plurality of longitudinally extending pleats (3) include two end pleats (5 & 6) joined together at a side seam, and the side seam comprising an adhesive bead (9) encapsulating all of the layers/sheets of filter material in distal ends of the end pleats (5 & 6) and the adhesive bead (9) extending radially inward between the end pleats, as in figs. 1 – 3 and cols. 1 – 3.

It is considered obvious to one of ordinary skill in the art at the time of the invention to modify the side seam of the filter element of Verdegan et al., as modified by Brownell, Nutter et al., Miller et al., Castellanos et al. and Briggs et al., in order to provide an alternative design and improved side seam which would not rupture and thereby prevent bypassing of the filter element (i.e. leaking of fluid) through the ruptured side seam (see col. 1 of Kersting).

59. Claims 26 and 59 – 61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Verdegan et al. in view of Miller et al. (048) and Briggs et al. (697).

60. With respect to claims 26 and 59,Verdegan et al. disclose a filter element comprising:

- a cylindrical filter media (30, 70) and,
- an exoskeleton support structure (40) surrounding (an inner periphery of) the filter media (30, 70); and
- the cylindrical filter media (70) comprising a plurality of longitudinally-extending pleats having radially-inner peaks defining an inner diameter (at 76), radially-outer peaks defining an outer diameter (at 78) and side walls extending therebetween;
- the exoskeleton support structure (40) comprising a support screen (in the form of a perforated metal liner), as in figs. 2 – 5 and cols. 1 – 3.

Verdegan et al. fail to disclose the support screen of the exoskeleton having a first set of cords extending in a first direction, a second set of cords extending in a second direction and intersecting with the first set of cords and openings defined therebetween, the cords being attached to each of the radially-outer peaks or each of the radially-inner peaks thereby exoskeletonally supporting the pleats in an appropriately spaced and non-collapsed condition; and adjacent cords in the first set being separated from each other by a distance d_1 and adjacent cords in the second set separated by a distance d_2, and adjacent radially-outer peaks being

separated from each other by a distance d_{pleat} and the distance d_1 between the first set of cords being about half to about twice the distance d_{pleat} between adjacent radially-outer peaks and the support screen being non-adhesively attached to the peaks (claim 26) and thermally bonded to the peaks (claim 59).

61. Miller et al. teach a similar filter element to that of Verdegan et al. wherein the filter element of Miller et al. comprises a cylindrical pleated filter media (20) and an exoskeleton support structure (wrap/mesh 70, as in fig. 9) for the filter media (20) and the support structure comprising a support screen (70) having a first set of cords extending in a first direction, a second set of cords extending in a second direction and intersecting with the first set of cords and openings (72) defined therebetween, the cords being attached to each of the radially-outer peaks thereby exoskeletonally supporting the pleats of the pleated filter media (20) in an appropriately spaced and non-collapsed condition, and the support screen (70 in the form of a polymeric mesh) being non-adhesively attached (i.e. by being fusion bonded or thermally bonded, claim 59) to the peaks, as in figs. 6 – 9 and cols. 9 - 12.

It is considered obvious to one of ordinary skill in the art at the time of the invention to modify the filter element of Verdegan et al. by substituting the support screen (i.e. 40) of Verdegan et al. in lieu of the support screen structure (70) of Miller et al., in order to provide an alternative design and improved support structure for the filter media of Verdegan et al., which not only provides a stable and strong support for the pleats such that they would not collapse under pressure or filtration conditions, but also provide greater open flow area for continuous flow towards the filter media (see cols. 9 - 10 of Miller et al.). Furthermore, the case law, ***In re***

Japikse, 86 USPQ 70 (CCPA 1950), has established that a prima facie case of obviousness exists and that the limitation of *having the support screen be placed in an inverted manner such that the support screen is located on the outer surface/outside the filter media (Miller et al.), which is opposite that of Verdegan et al. (the support screen 40 is located internally or on an internal surface of the filter media 30, 70 along 76)*, is not considered an invention since the applicant is merely shifting the position of *the support screen* to a different position and the operation of the device (use as a filter device) would not be modified by doing so. In the case where the support screen is placed on the outer surface to support the outer peaks of the pleated filter, the force or pressures are due to an inside-out radial flow (reverse flow compared to that of Verdegan et al.).

62. Verdegan et al., as modified by Miller et al., fail to teach *adjacent cords in the first set being separated from each other by a distance d_1 and adjacent cords in the second set separated by a distance d_2, and adjacent radially-outer peaks being separated from each other by a distance d_{pleat} and the distance d_1 between the first set of cords being about half to about twice the distance d_{pleat} between adjacent radially-outer peaks and the support screen being non-adhesively attached to the peaks* (claim 26).

63. Briggs et al. teach a similar pleated filter element to that of Verdegan et al., as modified by Miller et al., the filter element of Briggs et al. including an exoskeleton (24) comprising a support screen having a first set of cords extending in one direction, a second set of cords extending in another direction and intersecting with the first set, and openings defined therebetween, and adjacent cords in the first set being separated from each other by a distance d_1

and adjacent cords in the second set separated by a distance d_2, and adjacent radially-outer peaks being separated from each other by a distance d_{pleat} and the distance d_1 between the first set of cords being about half to about twice the distance d_{pleat} between adjacent radially-outer peaks and the support screen (24) being attached to the outer peaks of the filter element/media (18), as in figs. 1 – 2 & 4 and cols. 1 – 2.

It is considered obvious to one of ordinary skill in the art at the time of the invention to modify the filter element of Verdegan et al., as modified by Miller et al., by adding the embodiment taught by Briggs et al., in order to provide the optimum spacing/open flow area for fluid flow between the pleats of the filter medium.

64. Regarding claim 60, Verdegan et al., as modified by Miller et al. and Briggs et al., have taught the limitations of claim 59 above. Verdegan et al., as modified by Miller et al. and Briggs et al. also teach the support screen (either 70 of Miller et al. or 24 of Briggs et al.) being a polymeric or synthetic mesh, but fail to teach the mesh being made specifically of PVC coated fiberglass (a well known polymeric or synthetic material). It is considered obvious to one of ordinary skill in the art to modify the polymeric/synthetic mesh material forming the support screen of Verdegan et al., as modified by Miller et al., and Briggs et al. from any polymeric or synthetic mesh material to a known type of polymeric or synthetic mesh material such as PVC coated fiberglass, in order to provide a material of construction for the support screen which is physically stable and lightweight. The case law ***In re Leshin***, 227 F.2d 197, 125 USPQ 416 (CCPA 1960) stated that a prima case of obviousness exists in a selection of a known

plastic/polymeric or synthetic material (in this instance, PVC coated fiberglass) to make a container of a type made of plastics/polymeric or synthetic materials, prior to the invention.

65. Claims 61 – 63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Verdegan et al., Miller et al. and Briggs et al., as applied to claim 26 above, and further in view of Friedmann et al. (US 5,814,219).

66. Concerning claim 61, Verdegan et al., as modified by Miller et al. and Briggs et al., have taught the limitations of claim 26 above. Miller et al. and Briggs et al., further teach the support screen (70 of Miller et al. or 24 of Briggs et al.) comprising a sheet of (polymeric or synthetic) mesh material, but fail to teach *the mesh material having lateral edges being joined together at a side seam which extends substantially the length of a longitudinal axis of the filter media*.

67. Friedmann et al. teach a similar pleated filter media/element to that of Verdegan et al., as modified by Miller et al. and Briggs et al., the element (20) of Friedmann et al. including a cylindrical media (28) having a plurality of longitudinally extending pleats, and an exoskeleton comprising a support screen (40) comprising a sheet of mesh material having lateral edges joined together at a side seam (42) which extends substantially the length of the longitudinal axis of the filter media (28), as in figs. 1 & 4E and cols. 3 – 6.

It is considered obvious to one of ordinary skill in the art at the time of the invention to modify the filter element of Verdegan et al., as modified by Miller et al. and Briggs et al., by

adding the embodiment taught by Friedmann et al., in order to provide an alternative support structure for the filter element which is provides adequate rigidity and stability to the filter element and improved means for maintaining pleat spacing (see col. 1 of Friedmann et al.).

68. Concerning claim 62, Verdegan et al. as modified by Miller et al., Briggs et al. and Friedmann et al., have taught the limitations of claim 61 above. Friedmann et al. also teach the lateral edges of the support screen (40) overlapping and being thermally bonded (using heat sensitive adhesives) together, as in col. 6, lines 58 - 62. The same motivation applied in claim 61 is applied here.

69. With regards to claim 63, Verdegan et al. as modified by Miller et al., Briggs et al. and Friedmann et al., have taught the limitations of claim 62 above. Friedmann et al. further teach the support screen being a mesh formed of a plastic material, as in col. 4, lines 19 – 23, but fail to teach the mesh being made of PVC coated fiberglass.

It is considered obvious to one of ordinary skill in the art to modify the plastic material forming the support screen of Verdegan et al., as modified by Miller et al., Briggs et al. and Friedmann et al., from any plastic material to a known/specific type of plastic material such as PVC coated fiberglass, in order to provide a material of construction for the support screen which provides a physically stable support (rigid) and is lightweight. The case law ***In re Leshin***, 227 F.2d 197, 125 USPQ 416 (CCPA 1960) stated that a prima case of obviousness exists in a

selection of a known plastic (in this instance, PVC coated fiberglass) to make a mesh of a type made of plastic materials, prior to the invention.

Response to Arguments

64. Applicant's arguments filed 1-29-04 have been fully considered but they are not persuasive. In particular, the arguments regarding the primary reference, Verdegan et al., in which the applicants argue or allege that the liner/support screen 40 (which has been shown as part of the background and prior art device incorporated by Verdegan et al. into his disclosure) is not necessary and would be eliminated in the instance that filter media (30) of the prior art is replaced by the filter media (70) invented by Verdegan et al., this is simply untrue. First of all, there is no disclosure or teaching anywhere in Verdegan et al.'s disclosure to support applicants' allegation that the rest of the prior art device (including the liner /support 40) would be eliminated when the filter media (70) is put in place of the filter media (30).

65. With regards to the arguments regarding the secondary references, Brownell and Nutter et al., one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

66. Applicant's arguments with respect to claims 4 – 6, 18 – 19, 26, 52 and 59 - 63 have been considered but are moot in view of the new grounds of rejection based on Verdegan et al, and in combination with newly applied prior art namely Miller et al. (048), Briggs et al. (697) and Friedmann et al. (219).

67. **This action is non-final.**

Conclusion

68. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marianne S. Ocampo whose telephone number is (571) 272-1144. The examiner can normally be reached on Mondays to Fridays from 8:30 A.M. to 4:30 P.M..

69. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda Walker can be reached on (571) 272-1151. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

70. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

M.S.O.

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